

REMARKS

The Office Action dated November 15, 2005 has been received and carefully noted. The period for response having been duly extended by the attached Petition for Extension of Time, the following remarks are submitted as a full and complete response thereto. Claims 1-19 are pending in this application and are respectfully submitted for consideration.

Claims 1-7, 11-15 and 19 stand rejected under 35 U.S.C. §103(a) as being obvious over *Raleigh* (US Patent No. 6,101,399) in view of *Pasternak* (US Publication No. 2003/0194973). The Office Action took the position that *Raleigh* teaches each and every element recited in claims 1-7, 11-15 and 19, except for the tunable diplexer. However, the Office Action cites to *Pasternak* as teaching this feature, and as such, the Office Action concluded that it would have been obvious to one of ordinary skill in the art to have combined the teaching of the references to generate Applicants' claimed invention. Applicants traverse the rejection and respectfully submit that the cited combination of references, when taken alone or in combination, fails to teach, show, or suggest each and every limitation recited in claims 1-7, 11-15 and 19.

Applicants' independent claim 1, upon which claims 2-10 depend, recites a base station of a cellular telecommunication system, comprising an antenna unit for radio frequency reception and transmission. An electronically tunable diplexer is connected to the antenna unit for separating a transmit radio frequency band from a receive radio frequency band. A tuning range of the electronically tunable diplexer covers at least two

radio frequency sub-bands used parallel in a telecommunication system. The electronically tunable diplexer is tunable, on site, to a radio frequency sub-band allocated to a base station. A transceiver is connected to the electronically tunable diplexer for performing a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station. The transceiver includes a signal conversion chain for performing at least a portion of the conversion. At least a portion of the signal conversion chain is shared between frequencies within the tuning range.

Applicants' independent claim 11, upon which claims 12-18 depend, recites a method of configuring a base station in a cellular telecommunication system, comprising tuning, on site, an electronically tunable diplexer connected to an antenna unit. A tuning range of the electronically tunable diplexer covers at least two radio frequency sub-bands used parallel in a telecommunication system, to a radio frequency sub-band allocated to a base station. A transceiver connected to the electronically tunable diplexer is adjusted to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station. The transceiver includes a signal conversion chain for performing at least a portion of the conversion. At least a portion of the signal conversion chain being shared between frequencies within the tuning range.

Applicants' independent claim 19 recites a base station in a cellular telecommunication system, comprising tuning means for tuning, on site, an electronically tunable diplexer connected to an antenna unit. A tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used parallel in a

telecommunication system, to a radio frequency sub-band allocated to the a base station, adjusting means are provided for adjusting a transceiver connected to the electronically tunable diplexer to perform a conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station, the transceiver including a signal conversion chain for performing at least a portion of the conversion, at least a portion of the signal conversion chain being shared between frequencies within the tuning range.

Applicants submit that the cited combination of references fails to teach, show, or suggest each and every element recited in claims 1-7, 11-15, and 19. Specifically, *Raleigh* teaches a method for forming an adaptive phase array transmission beam pattern at a base station without knowledge of array geometry or mobile feedback. In the method, estimates of receive vector propagation channels are used to estimate transmit vector channel covariance matrices, which form objectives and constraints in quadratic optimization problems leading to optimum beam former solutions.

Pasternak teaches tunable element in the microwave frequency range that includes tunable elements that are directly and digitally controlled by a digital bus connecting a digital control circuit to each controlled element. Each digital signal is filtered by a digital isolation technique so that the signal reaches the tunable elements with very low noise. The low noise digital signals are then converted to analog control voltages, where the direct D/A conversion is accomplished by a special D/A converter which is manufactured as an integral part of a substrate. This D/A converter includes a resistor ladder or a direct digitally controlled capacitor. The direct digitally controlled capacitor

may be a cantilevered type capacitor having multiple separate electrodes or sub-plates representing binary bits that may be used to control the capacitor.

Although *Raleigh* discloses a general structure of a base station including a base station antenna array 56, a diplexer 58, an RF receiver 54 and an RF transmitter 52, both *Raleigh* and *Pasternak*, when taken alone or in combination, fail to teach, show, or suggest that the diplexer is an electronically tunable diplexer, as expressly recited in Applicants' independent claims 1, 11, and 19. The electronically tunable diplexer has a tuning range that covers at least two radio frequency sub-bands used in parallel in a telecommunication system, and which is tunable, on site, to a radio frequency sub-band allocated to a base station. Neither *Raleigh* nor *Pasternak*, when taken alone or in combination, teach, show, or suggest this feature, and as such, reconsideration and withdrawal of the rejection of claims 1, 11, and 19, along with each claim depending therefrom, is respectfully requested.

Further, referring to Figure 2A of *Raleigh*, a beam forming network 50 comprises a base station antenna array 56, which serves to produce independent transmit and receive antenna beams for facilitating communication with one or more mobile units. The beam forming network 50 further comprises a diplexer 58, which can be employed to allow the antenna array 56 to be used for both transmit and receive operation by isolating the RF receiver 54 from the RF transmitter 52. However, both *Raleigh* and *Pasternak*, when taken alone or in combination, fail to teach, show, or suggest that the RF receiver or RF transmitter includes a signal conversion chain for performing at least a portion of a

conversion between a fixed frequency band and the radio frequency sub-band allocated to the base station, at least a portion of the signal conversion chain being shared between frequencies within the tuning range, as recited in Applicants' independent claims 1, 11, and 19. Therefore, reconsideration and withdrawal of the rejection of claims 1, 11, and 19, along with each claim depending therefrom, is respectfully requested.

Further, although *Pasternak* discloses a digital diplexer, both *Pasternak* and *Raleigh*, when taken alone or in combination, fail to teach, show, or suggest that the diplexer separates a transmit radio frequency band from a receive radio frequency band, a tuning range of the electronically tunable diplexer covering at least two radio frequency sub-bands used parallel in a telecommunication system, the electronically tunable diplexer being tunable, on site, to a radio frequency sub-band allocated to a base station, as recited in Applicants' independent claims 1, 11, and 19. Therefore, reconsideration and withdrawal of the rejection of claims 1, 11, and 19, along with each claim depending therefrom, is respectfully requested.

Further, Applicants submit that, based on the common knowledge of one of ordinary skill in the art, it is known that microwaves are electromagnetic waves with wavelengths longer than those of infrared light, but shorter than those of radio waves. In page 4, paragraphs 41 and 42, *Pasternak* discloses that the transmit frequency and the receive frequency are between 29 GHz and 39 GHz. The aforementioned microwave frequencies represent the middle range frequencies in the microwave frequency scale, and cannot be used as radio frequency sub-bands allocated to a base station. Furthermore,

Pasternak discloses in page 1, paragraphs 3-7 that the digitally tunable diplexer indeed provides an alternative for the use of radio frequencies in telecommunication. Therefore, Applicants submit that even if the elements of the cited references were combined, they would not be operable, and as such, Applicants submit that the Office Action has improperly combined the references in support of the §103 rejection. Reconsideration and withdrawal of the rejection is respectfully requested.

Further supporting Applicants' position that the references are improperly combined, Applicants submit that the transceiver structure of *Raleigh* would not be able to downconvert or upconvert microwave frequencies into a fixed frequency band, and to be shared between microwave frequencies within the tuning range of the digitally tunable diplexer, as recited in Applicants' claims. Further, the digitally tunable diplexer of *Pasternak* is not tunable to a radio frequency sub-band allocated to a base station, as expressly recited in Applicants' claims. Even if it were, the transceiver structure of *Raleigh* would not be able to downconvert or upconvert radio frequency sub-band into a fixed frequency band, and to be shared between frequencies within the tuning range, as recited in Applicants claims. Therefore, Applicants submit that not only does the cited combination of references fail to teach, show, or suggest each and every limitation recited in the rejected claims, but also, that even if the references were combined, they would not form an operable apparatus or method. As such, Applicants submit that the cited combination of references fails to anticipate or render obvious Applicants' claimed invention. Reconsideration and withdrawal of the rejection is respectfully requested.

Furthermore, Applicants note that the problems solved by the *Raleigh* and *Pasternak* are different from that dealt with by the current application. In column 3, lines 11-30 of *Raleigh*, it is explained that the goal is to provide an adaptive transmit beam forming technique, which enhances remote user receive signal quality by utilizing the uplink signal energy received from remote users without the feedback from the mobile user. In page 1, paragraphs 2, 3 and 4 of *Pasternak*, the shrinking availability of radio frequencies for broadband communications network access for homes and offices is presented as a problem or challenge to be addressed by the invention. In the current application, the challenge to be addressed is a large variety of base stations equipped with a variety of frequency band specific-electronics to cover a desired frequency space in the frequency spectrum. The need for the frequency band-specific electronics complicates the structure and operation of a base station, thus increasing the manufacturing costs of the base station. Therefore, aside from the fact that the cited combination references fails to teach, show, or suggest each and every limitation recited in Applicants claims, given that the respective references are directed to solving different problems related to different types of signal processing, Applicants submit that one skilled in the art would not have been motivated to combine the teaching of *Raleigh* and *Pasternak* in order to solve the cited problem.

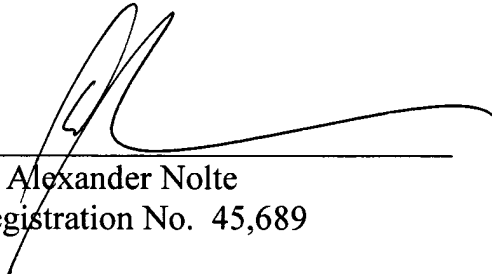
In conclusion, Applicants submit that each of claims 1-19 recite subject matter that is not taught, shown, or otherwise suggested by the cited combination of references, when taken alone or in combination. Furthermore, Applicants submit that one of ordinary skill in the art would not have been motivated to combine the references, as the resultant

apparatus would not be operable in the manner recited in Applicants' claims. Therefore, reconsideration and withdrawal of the rejection of claims 1-7, 11-15, and 19 is respectfully requested. Claims 1-19 are pending in this application and are respectfully submitted for consideration.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the Applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



N. Alexander Nolte
Registration No. 45,689

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Tysons Corner, Virginia 22182-2700
Telephone: 703-720-7800
Fax: 703-720-7802

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Enclosures: Petition for Extension of Time (3 months)